

WHAT IS CLAIMED IS:

1 1. In a receiver section of a relayed communication system, a method for
2 removal of self-interference comprising:
3 modeling downconversion imperfections in a receiver downconverter in said
4 receiver section;
5 compensating for said downconversion imperfections in a received relayed
6 composite signal to produce a compensated composite signal; and
7 canceling self-generated signal portions from said compensated composite
8 signal to provide an output signal for demodulation.

1 2. The method according to claim 1 wherein said receiver downconverter
2 model imperfections include at least one of the following:
3 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
4 imbalance.

1 3. The method according to claim 1 wherein said upconversion
2 imperfection compensating step includes setting d.c. level based on said modulated output
3 signal.
4

1 4. The method according to claim 1 wherein said upconversion
2 imperfections compensating step includes comparing at least one of the following:
3 phase and magnitude of said modulated output signal with corresponding
4 characteristics of said replicated modulated user signal.

1 5. In a receiver section of a relayed communication system, a method for
2 removal of self-interference comprising:
3 modeling upconversion imperfections in a transmitter upconverter in a
4 transmitter section; and
5 compensating for said upconversion imperfections to produce a compensated
6 composite signal; while
7 canceling self-generated signal portions from said compensated composite
8 signal to provide an output signal for demodulation.

1 6. The method according to claim 5 wherein said compensating and
2 canceling steps are based on a representation of a self-generated signal and a received relayed
3 composite signal.

1 7. The method according to claim 6 wherein said representation of said
2 self-generated signal is a delayed replicated self-generated signal.

1 8. The method according to claim 5 wherein said transmitter upconverter
2 model imperfections include at least one of the following:
3 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
4 imbalance.

1 9. The method according to claim 5 wherein said upconversion
2 imperfection compensating step includes setting d.c. level based on said modulated output
3 signal.

1 10. The method according to claim 5 wherein said upconversion
2 imperfections compensating step includes comparing at least one of the following:
3 phase and magnitude of said modulated output signal with corresponding
4 characteristics of said replicated modulated user signal.

1 11. The method according to claim 5 wherein said upconversion
2 imperfections compensating step includes comparing phase of said modulated output signal
3 with corresponding characteristics of said replicated modulated user signal.

1 12. The method according to claim 5 wherein said upconversion
2 imperfections compensating step includes correlating said modulated output signal with said
3 replicated modulated user signal.

1 13. The method according to claim 12 wherein said correlating is among
2 any two quadrature components.

1 14. A method for self-interference removal in a relayed communication
2 system comprising:
3 providing a model of an imperfect receiver downconverter;

4 compensating for downconversion imperfections in said imperfect receiver
5 downconverter at the output of said receiver downconverter to remove said downconversion
6 imperfections to produce a compensated composite signal;
7 providing a model of an imperfect transmitter upconverter;
8 replicating a modulated user signal using as input a user baseband signal to
9 produce a replicated modulated user signal;
10 compensating for upconversion imperfections in said imperfect transmitter
11 upconverter on said replicated modulated user signal to remove said upconversion
12 imperfections to produce a compensated replicated modulated user signal; and
13 canceling said compensated replicated modulated user signal from said
14 compensated composite signal to provide a modulated output signal.

1 15. The method according to claim 14 wherein said receiver
2 downconverter model imperfections include at least one of the following:
3 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
4 imbalance.

1 16. The method according to claim 14 wherein said transmitter
2 upconverter model imperfections include at least one of the following:
3 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
4 imbalance.

1 17. The method according to claim 14 wherein said receiver
2 downconverter model imperfections include at least one of the following:
3 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
4 imbalance; and wherein
5 said transmitter upconverter model imperfections include at least one of the
6 following:
7 quadrature phase offset, quadrature d.c. imbalance, and quadrature amplitude
8 imbalance.

1 18. The method according to claim 14 wherein said upconversion
2 imperfection compensating step includes setting d.c. level based on said modulated output
3 signal.

1 19. The method according to claim 14 wherein said upconversion
2 imperfections compensating step includes comparing at least one of the following:
3 phase and magnitude of said modulated output signal with corresponding
4 characteristics of said replicated modulated user signal.

1 20. The method according to claim 14 wherein said downconversion
2 imperfection compensating step includes setting d.c. level based on output level of said
3 downconverter.

1 21. The method according to claim 20 wherein said downconversion
2 imperfections compensating step includes comparing at least one of the following:
3 phase and magnitude of the output of said downconverter with corresponding
4 characteristics of said compensated composite signal.

1 22. The method according to claim 14 wherein said upconversion
2 imperfections compensating step includes comparing phase of said modulated output signal
3 with corresponding characteristics of said replicated modulated user signal.

1 23. The method according to claim 14 wherein said upconversion
2 imperfections compensating step includes correlating said modulated output signal with said
3 replicated modulated user signal.

1 24. The method according to claim 23 wherein said correlating is among
2 any two quadrature components.

1 25. An apparatus for self-interference removal in a relayed communication
2 system comprising:

3 a first compensator for compensating for downconversion imperfections in
4 said imperfect receiver downconverter at the output of said receiver downconverter to remove
5 said downconversion imperfections to produce a compensated composite signal;

6 a replicator for replicating a modulated user signal using as input a user
7 baseband signal to produce a replicated modulated user signal;

8 a second compensator for compensating for upconversion imperfections in
9 said imperfect transmitter upconverter on said replicated modulated user signal to remove

10 said upconversion imperfections to produce a compensated replicated modulated user signal;
11 and
12 a canceller for canceling said compensated replicated modulated user signal
13 from said compensated composite signal to provide a modulated output signal.

1 26. In a receiver section of a relayed communication system, an apparatus
2 for removal of self-interference comprising:
3 a compensator for compensating for said downconversion imperfections in a
4 received relayed composite signal to produce a compensated composite signal; and
5 a canceler for canceling self-generated signal portions from said compensated
6 composite signal to provide an output signal for demodulation.

1 27. In a receiver section of a relayed communication system, an apparatus
2 for removal of self-interference comprising:
3 a compensator for compensating for said upconversion imperfections to
4 produce a compensated composite signal; and
5 a canceller for canceling self-generated signal portions from said compensated
6 composite signal to provide an output signal for demodulation.